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ABSTRACT

Early explanations of sound change were often sought in extralinguistic factors such as climate or the speakers' physiology. More recently, scholars have been reluctant to explain changes this way, but the most widely accepted extralinguistic explanation is the substratum theory. Other linguists, notably the Prague group, looked to the linguistic system itself for causes of sound change. Skepticism at ever finding explanations was expressed by generative grammarians. A landmark in this discussion came when R. Lass (1980) suggested that to explain change was to predict it, which is impossible. Subsequently, an approach that looks at both internal and external factors has gained favor. Four uses of the term "explanation" exist: a general historical one; an approach suggesting the universal nature of sound change; explanation having predictive power; and, most commonly, explanation of specific changes. The fact that language is subject to variation does not explain sound change, but does point to its possible origin. Variants may be idiosyncratic and not spread, or may find their way into the linguistic system. Language-specific explanations entail other issues. Explanations of sound change can be given as long as it is realized that they merely connect phenomena to their effects. Contains 57 references. (MSE)

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Charles V. J. Russ

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EXPLANATION OF SOUND CHANGE. HOW FAR HAVE WE COME AND WHERE ARE WE NOW?

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1. Introductory: The development of explanations

1.1 Extralinguistic explanation

Early explanations of sound change were often sought in extralinguistic factors such as the climate, or the physiology of the speakers. Thus, the second or High German sound shift in which the initial Germanic voiceless stops became affricates , e.g. p, t, k became [pf], [ts], [kx] (the velar only in Upper German). This change was carried through in initial position before vowels and, in the case of p and k before /l/ and /r/, while t was only shifted before /w/. This was viewed by some linguists as being caused by the Alpine climate. Since it was carried through most completely in Southern Germany, Austria and Switzerland, which are mountainous regions, it was assumed that there was a causal relationship between the sound shift and the climate or geography of the region. This view was advanced by serious linguists, but it was to be refuted by Jespersen. He pointed out that the tendency to affrication of voiceless stops was not confined to mountainous regions, but that there was a strong tendency to affricate initial prevocalic t in the colloquial speech of Copenhagen (Jespersen 1922: 256f). Similar explanations were given for the First Germanic Sound Shift (see survey in Russ 1978: 169-73).

Most scholars have been hesitant to explain sound changes in terms of extralinguistic factors, but the most widely accepted way that extralinguistic factors are used to explain change is in the substratum theory. The Latin of the Roman Empire was imposed on countries with

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other native languages, e.g. Celtic in France, and consequently the natives of these countries imposed the features of their own language on the Latin they learned. These original, or substrate languages died out in most cases, but have left their mark in the way Latin has developed in different countries. For instance some linguists claim that the French change of Latin ū to [y:], e.g. Latin *mūrus*, French *mur*, is due to the Celtic substrate, or that the shift of f to h, which is then lost in pronunciation in Spanish, e.g. Latin *facere*, Spanish *hacer* 'to do', is due to the Basque substrate. In general it is accepted that some changes may be due to substrate languages but the actual extent of this is not agreed (see Pellegrini 1980 for further references).

Much of the use of extralinguistic factors in explaining sound changes has been speculative and many changes have been found which could not be put down to these factors. Bloomfield, and structural American linguists in general, thought that the search for explanations or causes of sound change was fruitless. Bloomfield said explicitly 'The causes of sound change are unknown' (Bloomfield 1935: 385). Hockett (1958), for example, contains no references to the causes of sound change.

1.2 Internal linguistic explanations

Other linguists, notably the Prague group, swung away from extralinguistic causes completely to the other extreme, wanting to see the causes of linguistic change in the linguistic system itself. They, and later Martinet, are the prime exponents of this view. They did not regard sound laws as blind, as the Neogrammarians did, nor fortuitous as de Saussure (1916: 127) thought, but rather purposeful. Sound change was seen as teleological, goal directed. This might take various forms. There might be various 'goals', the removal of peripheral phonemes, e.g. /ɔɪ/ in English (Vachek 1964), or of phonemes with a low functional yield, e.g. the merger of /ɛ̃/ and /œ̃/ or /ɑ̃/ and /ɔ̃/ in French (Martinet 1961: 210f), or the making of an asymmetrical system symmetrical. A persuasive example of the last type of change in Swiss German dialects has been given by Moulton (1961: 155-182). Classical Middle High German is assumed to have the following short vowel system:

i	ü	u
e	ö	o
ë		
ä		a

This is an asymmetrical system, since the back vowels have one less tongue height than the front unrounded vowels. In the North East of Switzerland this system was made symmetrical by the split of /o/ into /o/ and /ɔ/: 'The asymmetry of the Middle High German system lay in the fact that the front vowels contained one more relevant level than the back vowels. In the West and Centre this asymmetry was removed by decreasing the number of front vowels. In the North and East the asymmetry was removed by increasing the number of back vowels: the /o/ of Middle High German *ofen, hose* (New High German *Ofen* 'stove', *Hose* 'trousers') split into modern /ofə/ ≠ /hɔsə/' (Moulton ibid., 172f [Translation CR]). The result of this change was a symmetrical short vowel system. There was a complementary split of Middle High German /ö/ into /ö/ and /œ/. Jakobson attempted to illustrate his teleological view of sound change by applying it to Russian. For example, the *akanje*, the merging of unstressed a and o, in Russian and other dialects, is seen as resulting from the change of the correlation: musical accent - unstressed vowels, to expiratory accent - unstressed vowels (Jakobson 1971: 92ff).

Martinet, building on the work of the Prague school, developed the notion of the push-chain and the drag-chain. When a phoneme moves phonetically in one direction and approaches another phoneme, e.g. /A/ > /B/, then /B/ may also move towards another phoneme, /C/, /B/ > /C/. This chain reaction is a push-chain, /A/ pushes /B/ towards /C/. Another possibility would of course be that /A/ and /B/ merge, but Martinet is more interested in the cases where this does not happen. If, taking the three phonemes /A/ /B/ /C/, /C/ moves first, away from /B/, then /B/ may well also be dragged into the space vacated by /C/, and then /A/ may be dragged into the space left vacant by the shifting of /B/ (Martinet 1952: 5ff; 1955: 48ff). For instance, in early Old High German there were two dental obstruents (excluding the sibilants) /ð/, and /d/. The latter was shifted to /t/ and the space thus left vacant was

then filled by the shift of /ð/ to /d/ (Penzl 1975: 86). This kind of chain reaction is called a drag-chain. This approach to sound change was taken up by many linguists, among them Weinrich, who, in his studies of Romance sound changes, sought to explain them without using extralinguistic factors (Weinrich 1958: 5ff).

This type of approach to sound change has been criticized on several grounds. The push-chains, drag-chains, development towards a symmetry are said to be only tendencies (King 1969: 191ff). There are asymmetrical sound systems - for instance many Upper German and Central German dialects have two front vowel phonemes /e/ and /ɛ/ but only one back vowel phoneme /o/. Enough evidence seems to have been produced that in certain cases sound changes can be explained in terms of other changes, but there are also many changes which cannot be thus explained. Also any teleological view of sound change is circular. In the Swiss German example taken from Moulton it could be seen that the result of the split of Middle High German /o/ into /o/ and /ɔ/ was a symmetrical short vowel system. The result and the cause are regarded in fact as being the same thing (Anttilla 1989: 193f). In other instances these explanations are only considered to be descriptions. This was the position taken up by a reviewer of Weinrich (1958): 'A mon avis, et j'espère pouvoir montrer par la suite qu'il est bien fondé, la phonologie diachronique ne pourra être que descriptive, ne saura jamais répondre à la question: POURQUOI? Pour répondre à cette question, il faut toujours recourir à des facteurs externes' (Togeby 1959/60: 402). However, although criticisms have been levelled against this approach, it has produced many results which have been accepted as worthwhile by many linguists.

1.3 Generative linguistics and explanation

The scepticism which Bloomfield expressed at ever finding explanations of sound changes was continued by generative grammarians. The most extreme position is that taken up by Postal: 'There is no more reason for languages to change than there is for automobiles to add fins one year and remove them the next, for jackets to have three buttons one year and two the next' (Postal 1968: 283). On the whole, the generative school has been criticized for not seeking

explanations for sound change. This is not entirely fair, since opinions among generative linguists seem to vary. King, for instance, is not as sceptical as Postal: 'If there is little risk in being a cynic about the origin of phonological change, there is also very little profit. In fact linguistics has a great deal to lose by the position that the cause of phonological change is beyond principled research' (King 1969: 190f). However, he does not give any clear explanation of sound change. One approach to explanation in sound change can be illustrated from Kiparsky's historically orientated article entitled 'Explanation in phonology'. He states: 'I have suggested a way in which the concept of a 'tendency', which lends functionalist discussions their characteristic unsatisfactory fuzziness, can be made more precise in terms of hierarchies of optimality, which predict specific consequences for linguistic change, language acquisition, and universal grammar' (Kiparsky 1972: 224). For Kiparsky, explanation in sound change is determined by constraints such as the conservation of functional distinctions, e.g. a sound change will tend not to eliminate number or tense endings. When sound changes cause phonological alternation within an inflectional paradigm, e.g. lengthening of short vowels in open syllables, North German [ta:gə], but nom. [tax] or [tak], the alternation will tend to be removed to make the paradigm regular, cf. standard German, *Tage*, *Tag*. Some sound changes may act together in a 'conspiracy' to produce a certain kind of phonological structure. However these constraints do not always apply. For instance modern German still retains the phonological alternation between medial voiced obstruents and final voiceless obstruents. This has been in existence since late Old High German and yet has not been levelled out except in a few dialects.

1.4 Some recent developments

Most textbooks on historical linguistics give surveys of some of the kinds of explanations and causes that have been outlined in 1.2 and 1.3, adding remarks on how sociolinguistics can help account for why particular variants are selected by a language (Anderson 1973: 3-5; Jeffers and Lehiste 1979: 88-105; Aitchison 1981: 111-69). A landmark in the discussion on explaining linguistic change is Lass (1980) who comes to the conclusion that to explain linguistic change must also

entail predicting it. Therefore, since prediction of changes is impossible, explanation is also impossible. However, Lass's conclusion challenged many linguists to search for explanations. Vennemann (1983) says that he will continue explaining linguistic change, particular in terms of what is and what is not a possible change. Bennett (1983) argues that Lass sets too high a standard for explanations and that linguists should continue to search for them: 'The best way to be sure of not discovering the causes of linguistic change is to adopt the working assumption that there are no such causes. But if we seek, we may find' (1983: 20). Aitchison (1987) in a contribution to a workshop set up because of the impact of Lass's claim maintains that linguists should at least be able to sketch possible paths of development for changes. Lass (1987), himself, seems to offer a less pessimistic scenario, urging linguists to take a more long-term view of changes in languages in any attempts at explanation. Kiparsky (1988) as well as surveying different types of change and causes expresses the view that the linguist should not be surprised or despair if one language develops a structure in one way whereas another language develops the same structure in a different way. This balancing act of using both internal, functional explanations as well as external, sociolinguistic ones is continued in recent works (Hock 1986: 627-61, and 1992: 228-31; Crowley 1992: 191-203; Ohala 1994: 4050-55). McMahon (1994: 46) expresses the problem by saying 'We shall consider further, generally particularistic and non-predictive, explanations of changes in all components of the grammar, while striving to find general causes and motivations for change.' The wish to find causes and the conviction that they may be discovered is thus very much alive.

2. Types of explanatory statement

We have so far used the term 'explanation' without any real definition. In the following sections four ways in which it is used will be examined and their usefulness evaluated. Much of this, paradoxically, derives from a little known review by Bloomfield (1934).

2.1 General Historical Explanation

Bloomfield (1934: 34f) outlines this type of explanation in the following terms: 'Where the facts are accessible, we can define a feature

of a language in terms of some earlier habit plus a change of habit'. This is a general form of explanation: something in the present can always be explained by saying that it represents something in the past plus a change. The strange shape of a house, for example, may be explained historically by saying that in the past there were two houses, which were than joined together. A linguistic example would be the explanation that umlaut in New High German is due to the fact that in Old High German the vowels affected were followed by an i, î, or j: 'Umlaut is used to express the change from a, o, u and au to ä, ö, ü and äu respectively ... . The cause of these vowel-changes can, as a rule, not be seen in modern German: in order to understand them, one requires to go back to the earlier stages of the language' (Eggeling 1961: 348). This type of explanation is not restricted to linguistics but it is common to all disciplines which have a historical branch. It has also fallen out of favour since it mixes the synchronic and the diachronic. De Saussure in his discussion of the necessity of separating the synchronic from the diachronic uses umlaut of noun plurals as part of his argument. He takes two stages in the development of German and English: At stage A the plural of some nouns is formed by adding -i: Old High German *gast, gasti*, OE *fôt, fôti*. At a later stage B, the plural is formed by changing the vowel, and in the case of German, adding -e: *Gast, Gäste, foot, feet*. For de Saussure, these ways of marking the plural have no historical connection. The only connection is between individual forms, e.g. *gasti*, which becomes *Gäste* (de Saussure 1916: 120ff). For him, umlaut in New High German would not be explicable in terms of Old High German. This attitude of de Saussure's seems to have influenced linguists in turning away from the diachronic study of language. This represents, in other disciplines as well as linguistics, 'a general loss of faith in the efficacy of historical explanation. We try to understand our present position by analysing the component forces in play, not by tracing *post facto* the long chain of major forces which have brought it about but may have ceased to operate' (Trim 1959: 19). This type of explanation is too unrestricted to account for why sound changes proceed along one particular path in one language but along a different path in another.

2.2 Universals of Sound Change

Another approach is to look at the universal nature of some sound changes. Some similar patterns occur in different languages. For instance, the raising of long and mid vowels has not only caused diphthongization in English, but also in Dutch, and probably also in German (Lass 1976). There is not an infinite number of sound changes but a restricted number. If these can be characterized, then an explanation can be attempted for a much smaller number. For the Neogrammarians, sound laws were fixed to one place and one dialect at one time. Consequently they did not believe in universals of sound change. For them, what was universal was that sound laws had no exceptions. However the whole question of universals has been discussed not only on a synchronic level but also on a diachronic level. This has chiefly taken the form of characterizing the possible forms of linguistic change and to what constraints they are subject (Kiparsky 1972; Vennemann 1982: 149-54; Labov 1994). Universals can help to explain sound changes in that they reduce the number of possible sound changes to a finite number. A sound change is deemed to have been 'explained' if it is assigned to a more general process. Sound change is viewed as consisting of a set of meta-rules: palatalization, nasalization and so on, from which a language selects one, which, subject to certain language specific constraints, will proceed in a defined way. For instance, if a language palatalizes consonants, first the velars will be affected, then the dentals and finally the labials. It will not affect labials only, or dentals only. The consonants (only obstruents have so far been considered) will be palatalized before high front vowels first, then before mid front vowels and finally before low vowels (Chen 1973). As an example, Italian has palatalized Latin k only before front high and mid vowels: Latin *civitatum, centum*, Italian *città, cento*, but this has not occurred before low vowels: Latin *cantare*, Italian *cantare*. French, on the other hand, has palatalized Latin k before a as well: French *cité, cent, chanter*. This approach does not completely solve the problem of causation of linguistic change, but it does attempt to overcome the *ad hoc* explanation of individual changes. Thus the change of Latin k to [tʃ] and further to [ʃ] in French is not seen as an isolated change but as part of the larger change of palatalization. Chen cites examples from many different languages which make his thesis seem plausible, but he

has to admit that there are exceptions. In Ancient Greek IE /kw/ and /t/ are palatalized to /t/ and /s/ respectively before /i/ and /e/. According to Chen's scheme, if a dental stop has been palatalized then a velar stop will have been palatalized as well. The reason for this exception, he says, is that IE /kw/ and /t/ are involved in a drag-chain. IE /s/ became /h/ in Ancient Greek, initially and medially, and the space left by the shifting of medial IE /s/ was filled by the palatalization of IE /t/ before /i/ in certain cases (there are exceptions to this).[1] The gap created by the change of /t/ to /s/ before /i/ was then filled by IE /kw/ becoming /t/ before /i/ and /e/.[2] Language specific changes like this drag-chain in Ancient Greek can invalidate the universal trend of palatalization. This may well turn out to be an isolated case, but on the other hand it belies the strong predictive power that Chen would like his theory to have.

Another approach to the problem of universals has been to set up universal strength hierarchies. For example, if obstruents are deleted or subject to lenition in a language, velars are most likely to be deleted first, then dentals and finally labials (Foley 1977: 28). Lass and Anderson (1973: 183-87), in their study of Old English obstruents, come to a different conclusion. When stops become weakened to fricatives the order is: dentals first, then labials and finally velars. Certain kinds of statements as to what are natural classes differ sometimes according to the language or period of the language concerned. This search for universal hierarchies is still very speculative and more detailed studies must be made available before it can be proved to have a more solid foundation. A phenomenon which is similar to strength hierarchies is the concept of the *Reihenschritt*.[3] If one phoneme of a phonetic order changes, then all the other phonemes of the same order change in the same way. A classic example is provided by the First Germanic Sound Shift where each member of each order of

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1 Buck 1933: para. 141: 'The assibilation of τ before ι is seen in large classes of words. But τ may also remain unchanged before ι, and the precise conditions governing this difference of treatment cannot be satisfactorily formulated.'

2 Chen 1973 takes his interpretation from Allen 1957-8: 122f.

3 Pfalz 1918 used *Reihenschritt* for vowel changes. A free translation in English might be 'parallel development'.

consonants changed its manner of articulation: the voiceless stops p, t, k became the voiceless fricatives f, θ, x, the voiced aspirated stops bh, dh, gh became either voiced stops or voiced fricatives according to their position in the word b/v, d/ð, g/ɣ, the voiced stops b, d, g became voiceless stops p, t, k (Fourquet 1954). Similarly all the Middle High German long high vowels (î, iu, û) diphthongized, not just one or two of them. The concept of *Reihenschritt* has been adopted by Martinet (1952: 17) to show how sound changes proceed by changes in distinctive features. In generative grammar the fact that parallel groups of sounds may change has been accounted for in terms of 'natural classes': 'Phonological changes tend to affect natural classes of sounds (p, t, k, high vowels, voiced stops), because rules that affect natural classes are simpler than rules that apply only to single segments' (King 1969: 122). The use of the word *tend* is significant in this quotation since these changes do not always take place. On the basis of natural classes one cannot always predict that of three voiceless stops, if t becomes an affricate, then p and k will become affricates as well. This may perhaps happen, as it does in some Upper German dialects, but it is by no means automatic.

Any universals that do exist seem, at the moment, to be only universal tendencies (even Chen 1973: 183 uses the term 'tendency'). Similar changes can be seen at work in many genetically unrelated and geographically widely dispersed languages. The important thing that this search for universals has shown is that sound change is not random but, all things being equal, sound changes, e.g. palatalization, will proceed in a predictable way, e.g. affecting velars first, then dentals and finally labials. But unfortunately in languages all things are not equal. Many other factors intervene. There may be the influence of the rest of the sound system, the morphology and syntax, and external influences from other dialects or languages. The social prestige of certain forms and their spelling may influence changes. All these factors may and do interfere in the smooth effectuation of these universal tendencies. There seems no way of predicting when these other factors will intervene. The search for universals has still not supplied an answer to the problem of the explanation of sound change in general.

2.3 The Predictive Power of Linguistic Explanation

This level of explanation can be characterized as the one 'in which we could account for the occurrence of a certain linguistic change at a certain place and time: e.g. Why did pre-Germanic change p, t, k to f, θ, h or why did English analogically extend the -s pl. of nouns? The answer would be a correlation of linguistic change with some other recognizable factor enabling us to predict the occurrence of a linguistic change whenever this factor was known' (Bloomfield 1934: 39f). Bloomfield sets this up as a goal to be reached, but does not offer, here or elsewhere, any solution. Nor, we must say, has any linguist to date. Chen, who deals with prediction in phonological change, has to set his sights lower: 'Even though we cannot predict that palatalization will take place in language X, we can nevertheless predict that if palatalization occurs at all it will spread along two dimensions or axes' (Chen 1973: 177). Once a sound change has taken place, its course can be predicted within certain limits, but we cannot predict why palatalization should take place in French but not in Dutch. This has been called the 'actuation problem' by some scholars: 'Why do changes in a structural feature take place in a particular language at a given time, but not in other languages with the same feature, or in the same language at different times?' (Weinreich, Labov and Herzog 1968: 102). For instance, why did the Germanic long high vowels diphthongize in German, English and Dutch but not in the Scandinavian languages? This type of question is the strongest and most interesting demand that could be made of a theory of explanation in historical linguistics. Unfortunately no answer can be given to it with the present state of linguistics, and it is doubtful whether there will ever be an answer.

2.4 The Explanation of Specific Changes

One of the most widespread interpretations of 'explanation' is the explaining of one event by another. Bloomfield puts this in the following way: 'A favoured earlier event, the 'cause', pulls a kind of invisible string which, in some metaphysical sense, forces the occurrence of a later event, the 'effect'' (Bloomfield 1934: 34). This assumes that one can connect some linguistic effects but not others. For instance, in the Germanic languages many original final vowels have been lost or reduced to [ə]. That is one linguistic event. It is also

assumed that the stress accent in Germanic, instead of falling potentially on any syllable, became fixed on the root syllable. This represents another linguistic event. Most linguists link these two events together, the fixing of the stress accent causing the weakening and loss of unstressed syllables: 'The strong stress accent on the stem (or first syllable) *caused* in Germanic a progressive weakening of unaccented syllables' (Prokosch 1939: 133). Similarly the mutation of the long and short back vowels a, o, u in the Germanic languages at various times has occurred before an i, î, or j in the following syllable. In this case it is usually said, not that one event caused another, but that one factor, the existence and nature of the following i, î, and j, caused the change known as i-mutation or umlaut. The following explanation illustrated this clearly: 'There are two types of mutation in O.E., one A., which affects back vowels is caused by a following i or j, the other, B., which affects front vowels, is caused chiefly by u, or o, in some dialects also by a' (Wyld 1921: para. 103). This mode of explanation refers chiefly to individual conditioned changes. Where changes are not phonetically conditioned, the explanatory power of one change or factor in terms of another one is not so convincing. Attempts have been made to explain one unconditioned change in the light of another. This is the type of event which Martinet has dubbed push- or drag-chain. The Great Vowel Shift in English has been explained in this way. The two most important steps in the vowel shift are the diphthongization of the long high vowels ME î and û, and the raising of the long mid vowels ME ê and ô. Scholars have postulated causal relationships between these changes. Luick thought that the raising of the mid vowels happened first and caused the already existing high vowels to diphthóngize, while Jespersen, on the other hand, thought that the diphthongization of ME long î, û created a hole, into which the mid vowels ME ê, ô were dragged (Lass 1976: 51-102; 1992).

It is very often not possible to establish with any accuracy the direction of the explanation in unconditioned changes such as this. Documentary evidence may be lacking or inconclusive. These explanations of changes in terms of other factors or events have one great drawback: they are not final explanations. It may be the case that the raising of the mid vowels caused the diphthongization of the high vowels, or, that the fixing of the stress accent on the root syllable

caused the weakening or loss of unstressed vowels. Even so there still remains the question of why the mid vowels were raised in the first place, or why the stress in Germanic became fixed to the root syllable. In other words, final causation is not provided for at this level. The type of explanation discussed here is of a specific sound change or changes. These will probably only occur in one language or in related languages and be tied to a particular period in that language. Most linguists would accept that this level of explanation, linking events to other events, as cause and effect, is indeed possible but that it is a weak form of the explanation of sound change.

3. Conclusion

What can be reasonably demanded of a linguistic theory is that it should explain language specific changes. Other types of explanation are far more difficult, if not impossible, to formalize. Research into universals may help, but much more evidence for many more different processes will have to be forthcoming before it is based on a surer footing

Most linguists, however, are agreed that languages are subject to change and that there is variation in the spoken chain. Where they differ is on the emphasis placed upon this. The fact that language is subject to variation does not explain sound change (this variation is simply a characteristic of language), but it does point to the possible origin of sound change. Variation in the spoken chain produces variants in pronunciation, grammar and vocabulary. The important thing is what happens to these variants once they have arisen for whatever reason. Two things are important here. The variants may be idiosyncratic and not spread at all, or they may find their way into the linguistic system (Samuels 1972: 140). It is at this point that the question 'why?' may begin to be asked. Here we find ourselves at the level of *ad hoc* language specific explanations. These entail what has been called the 'transitional problem', i.e. what intermediate forms there are, and the 'embedding problem', i.e. how does a change fit into (a) the linguistic system as a whole, and (b) into the social structure of the users of the language concerned? There is also the 'evaluation problem', i.e. how the speakers themselves reacted to the change (Weinreich, Labov and Herzog 1968: 184ff). The question 'why?' seems only answerable in the

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case of why a particular variant was selected by the linguistic system in a certain case, rather than saying why one was not selected.

Explanations or causes of sound changes can be given as long as it is realized that they merely entail connecting phenomena to their effects, the reason for the selection of a particular variant or process may be due to several factors, in other words there may be multiple causation (Malkiel 1967). All such explanations are ad hoc, even though they represent a selection from a restricted range of sound changes (Samuels 1972: 155f). The ultimate causes of sound change are unknown but in many cases we can see with varying degrees of confidence what the immediate causes are.

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